

Claims 33, 37, and 42 have been amended. Claims 1-49 are now pending in the present case.

DEPOSIT OF BIOLOGICAL MATERIAL

With regard to the deposit of inbred line PH3AV, Applicant wishes to note that:

- (a) during the pendency of this application access to the invention will be afforded to the Commissioner upon request;
- (b) all restrictions upon availability to the public will be irrevocably removed upon granting of the patent;
- (c) the deposit will be maintained in a public depository for a period of thirty years, or five years after the last request for the enforceable life of the patent, whichever is longer;
- (d) a test of viability of the biological material at the time of deposit will be conducted (see 37 C.F.R. § 1.807); and
- (e) the deposit will be replaced if it should ever become inviable.

Applicant wishes to state that the actual ATCC deposit will be delayed until the receipt of notice of otherwise allowable subject matter. Once such notice is received, an ATCC deposit will be made, and the claims will be amended to recite the ATCC deposit number. In addition, Applicant submits that at least 2,500 seeds of PH3AV will be deposited with the ATCC.

ISSUES UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claim 33 is rejected under 35 U.S.C. § 112, second paragraph, because "The recitation of 'said maize plant' is both vague and indefinite as it lacks a clear antecedent basis as to which plant is being referred to." Claim 33 has been amended to state, "A PH3AV-derived maize plant, or parts thereof, wherein at least one ancestor of said PH3AV-derived maize plant is the maize plant of claim 21, said PH3AV-derived maize plant expressing a combination of" In light of the amendment, Applicant submits that claim 33 is now in proper form and requests that the Examiner withdraw his rejection.

Claims 1, 6, 21, 25, 37, and 40 stand rejected under 35 U.S.C. § 112, second paragraph, as being "incomplete in the recitation of the limitation 'representative seed

having been deposited under ATCC accession number ____." The Applicant respectfully submits that the pertinent claims will be amended at such a time the actual deposit has been made as set forth in 37 C.F.R. §§1.801-1.809. Applicant further submits the deposit will be delayed until notice of otherwise allowable claims is provided under 37 C.F.R. § 1.809. Once notice of allowable claims has been received by Applicant, a deposit will be made with the ATCC and the claims will be amended to recite the accession number.

Claims 37-39 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner asserts that "the process step in part (c) of 'identifying said inbred plants;' is both vague and indefinite in failing to set the metes and bounds of the invention." The Examiner states that "the method steps do not teach or identify how the person having skill in the art would identify PH3AV from the other parent(s) of the hybrid" and further that the steps claimed in claim 38 and claim 39 fail to distinguish the parent which is not PH3AV. Additionally, the Examiner notes "the limitation in part (e) 'in a manner which preserves the homozygosity of said inbred...' fails to set the metes and bound or provide a positive method step to meet the requirement to preserve the homozygosity of the plant."

Applicant respectfully traverses this rejection. Claim 37 and dependent claims 38 and 39 are clearly directed to a process for producing inbred PH3AV whereby the starting material is an inbred found in a bag of hybrid seed wherein PH3AV is one of the parents of said hybrid. The present application clearly teaches at page 5, line 21, to page 6, line 10, that the identification of a selfed parent, usually the female parent, is a routine practice to one of skill in the art. The self-pollinated inbreds found in hybrid seed are usually the result of incomplete removal or incomplete inactivation of the pollen from the female parent in the production of hybrid seed. This inadvertently self-pollinated seed may then be unintentionally harvested and packaged with the hybrid seed.

As the male rows in a production field are routinely harvested separately or culled from those female rows producing the hybrid seed, one of skill in the art would realize that inadvertent selfs in a bag of hybrid seed are most likely those of the female parent, but it is also well known in the art that an inbred could be used as either a female or male in hybrid production. The present application teaches that the self-

pollinated plants can be identified and selected due to their decreased vigor. In addition, analysis can be conducted utilizing molecular marker techniques known to those of skill in the art whereby lines suspected to be inbred parents can be shown to have predominantly homozygous genetic composition.

Claim 37 is clearly directed to the parent which is PH3AV. Inbred line PH3AV has been clearly described through both written description and examples (see page 16, lines 3-13; Table 1 on pages 17-19; Tables 2A-2B on pages 37-38). However, in an effort to expedite prosecution, Applicant has amended claim 37 to recite that morphological and/or physiological data is collected in order to identify said inbred parent as PH3AV. As such the claim now requires that data be collected to identify the parent as PH3AV. Earlier Applicant recited in step (c) that the PH3AV parent plant was identified simply after planting seed of a hybrid, one of whose parents is inbred line PH3AV. The claim now recites that one must plant the hybrid, grow the plants, identify parent plants, select the parent plants, control pollination by self-pollinating to preserve homozygosity of the parent plant, and also collect sufficient data to identify the parent as PH3AV. It is submitted that this will allow for the identification of PH3AV to distinguish it from the other parent even if the other parent is closely related to PH3AV.

In light of the above remarks, Applicant submits that claim 37, and therefore dependent claims 38 and 39, now clearly distinguish that the inbred line to be selected is PH3AV and not the second parent.

Claims 40-46 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner states that "the limitation 'with itself or another maize plant' is not limited to inbred PH3AV, and as such is drawn to any maize plant which is capable of meeting the limitation to yield progeny maize seed to encompass all of maize *per se*." The Examiner states that the claims are directed to "the art recognized steps, and results, of backcross breeding, in which one or several traits are introgressed into a recurrent parent from a donor parent" and as claimed, inbred PH3AV may comprise either parent in that backcross breeding method. The Examiner asserts that Allard (Principles of Plant Breeding) teaches that after the third backcross the population usually resembles the recurrent parent so closely "that selection on an individual-plant basis is largely ineffective except for the characteristic

being transferred". Based on this reference, the Examiner asserts that "the metes and bounds of the phrase 'derived from' would encompass both plants that are essentially prior art plants and those that are essentially identified as the instant inbred. Thus, the claimed invention is indefinite for failing to particularly point out and distinctly claim the subject which applicant regards as the invention."

Applicant respectfully traverses this rejection. The Examiner's assertion that claim 42 is directed to backcross breeding, while correct in part, is more narrow in limitation than the actual claim is entitled. In fact, while claim 42 could in fact be directed to backcross plant breeding, it could also include other methods such as pedigree selection and recurrent selection breeding methods of which backcrossing is but an example. Claims 40-46 are clearly directed to maize lines that are derived from the use of PH3AV as source material. The Examiner is correct in his assertion that "itself or another maize plant" in part (c) could comprise PH3AV, a PH3AV-derived line, or a completely different maize plant. However, when reading the individual parts (c) through (e) detailed in claim 42, it is clear that the inbred maize line PH3AV-derived maize plant has been derived from inbred line PH3AV.

The teaching of Allard as quoted and interpreted by the Examiner is directed to only those situations where PH3AV would be used as a donor (or non-recurrent) parent for the integration of a simply inherited or single gene trait into another inbred line. However, one of skill in the art would recognize that it is not always possible to have populations large enough to enable selection in less than three backcrosses. For instance, if a cross between two parents differed for five allelic pairs, the smallest theoretical F₂ population would require 1,024 individuals and if the parents differed for ten allelic pairs, this population would need to include 1,048,576 individuals. As most traits emphasized in the selection of lines are controlled by more than five genetic factors, compromises must be made in sample size and therefore additional crosses may be necessary to select and obtain the genotype of interest. See Hallauer *et al.* (1988) "Corn Breeding" Corn and Corn Improvement, No. 18, pages 470-472 (A6). Further, Hallauer also teaches (see page 472) that "the complexity of the backcross method depends on the type of trait being transferred (single gene versus several genes), level of expressivity, whether cytoplasmic or nuclear inheritance, and the types of parents included in the crosses." Even Allard in the following paragraph on page 156,

stated that when one of the parents in a backcross is superior to the other in a majority of its characters, "sufficient heterozygosity remains after two or three or four backcrosses to furnish a satisfactory basis for selection for yield (or other characteristics) in families derived from backcrossed plants." Allard goes on to suggest that stopping the backcrossing early can result in transgressive segregation, and "relinquishment of control over the genetic forces that the backcross method regulates so precisely."

Further, one of skill in the art would recognize that other methods for creating PH3AV-derived maize plants also include such techniques as pedigree selection or recurrent selection wherein superior plants from an F_2 population are selected and grown in rows where plants have been spaced sufficiently such that individual plants can be examined. The selection in harvest of superior plants from within that row then supply the seed for the next repetition of steps (c) and (d) wherein the plants may then once again be selfed with selection conducted. As noted in Allard, when dealing with multiple traits or complex inheritance patterns, it routinely takes five or more backcross generations with selection to obtain homozygosity for pertinent loci of the superior parent.

In an effort to expedite prosecution, Applicant has amended claim 42, step (e) to recite from 0 to 4 crosses to incorporate both the teaching of the present application, and that of Allard. With regard to the Examiner's concern that the claims would encompass maize *per se*, Applicant points out that amended claim 42, step (e), requires that the further PH3AV-derived inbred maize plant expresses a trait genetically derived from PH3AV. In light of the amendment, Applicant requests that the Examiner reconsider this rejection.

CONCLUSION

Attached hereto is a marked-up version of the changes made to the claim by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE".

Applicant submits that in light of the foregoing amendments and remarks, the claims as amended are in condition for allowance. Reconsideration and early notice of allowability is respectfully requested.

Respectfully submitted,
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

Claims 33, 37 and 42 have been amended as follows:

33. (Amended) A PH3AV-derived maize plant, or parts thereof, wherein at least one ancestor of said PH3AV-derived maize plant is the maize plant of claim 21, said PH3AV-derived maize plant expressing a combination of at least two PH3AV traits selected from the group consisting of: a relative maturity of approximately 84 based on the Comparative Relative Maturity Rating System for harvest moisture of grain, early flowering, good seed quality, good ear mold tolerance, good stalks, very good plant health, hard kernel texture, good early growth, high grain yield, high silage yield, high silage quality, high starch content of silage, high energy content of silage, early maturing for silage, slow drying for grain and adapted to the Northwest region of the United States, Western Canada and Northern Europe.

37. (Amended) A process for producing inbred PH3AV, representative seed of which have been deposited under ATCC Accession No. _____, comprising:

- (a) planting a collection of seed comprising seed of a hybrid, one of whose parents is inbred PH3AV said collection also comprising seed of said inbred;
- (b) growing plants from said collection of seed;
- (c) identifying [said] inbred [PH3AV] parent plants;
- (d) selecting said inbred [PH3AV] parent plant; [and]
- (e) controlling pollination [in a manner] through selfing, which preserves the homozygosity of said inbred [PH3AV] parent plant[.]; and
- (f) collecting morphological and/or physiological data so that said inbred parent may be identified as inbred PH3AV.

42. (Amended) The method of claim 40, further comprising:

- (c) crossing said PH3AV-derived maize plant with itself or another maize plant to yield additional PH3AV-derived progeny maize seed;

- (d) growing said progeny maize seed of step (c) under plant growth conditions, to yield additional PH3AV-derived maize plants;
- (e) repeating the crossing and growing steps of (c) and (d) from 0 to [5] 4 times to generate further PH3AV-derived maize plants[.], wherein said further PH3AV-derived maize plants express a trait genetically derived from inbred PH3AV.